

# 恒跃-EthOS天线设计和试验报告

Antenna Design And Test Report



RF:朱工

电话: 18825230056

报告日期: 2024年10月25日星期五



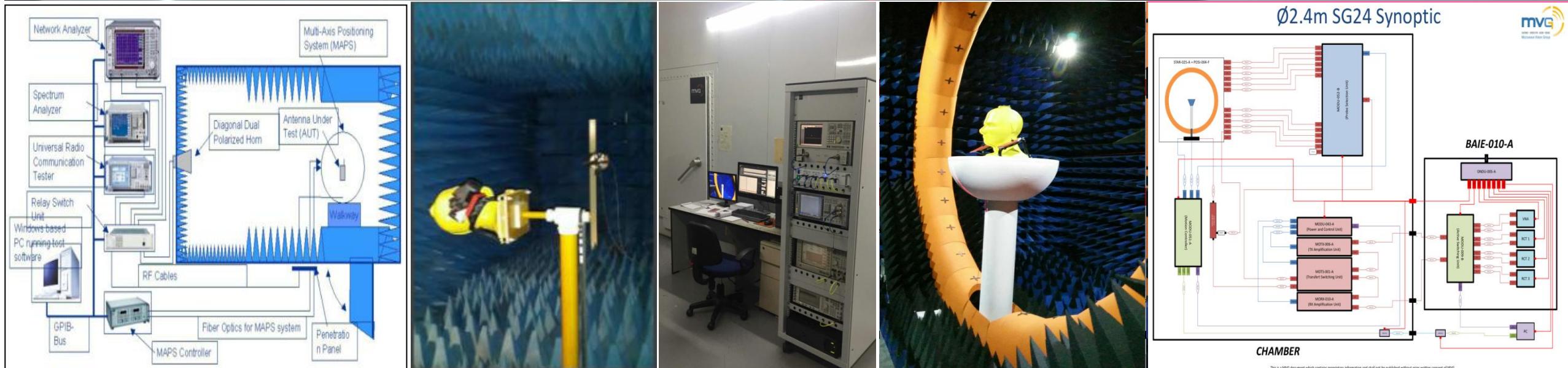
# 项目概述

主天线设计频段: main antenna design spectrum	GSM900/850/1800/1900 WCDMA B1/2/4/5/8 LTE- B1/2/3/4/5/7/8/12/13/20/25/26/28/ 66/71/38/39/40/41
天线类型: Type of antenna	PIFA
副天线设计频段: Deputy antenna design spectrum	WIFI /GPS/BT
天线类型: Type of antenna	PIFA
分集天线频段: Frequency diversity antenna	WCDMA B1/2/4/5/8 LTE- B1/2/3/4/5/7/8/12/13/20/25/26/28/ 66/71/38/39/40/41
天线类型: Type of antenna	PIFA

报告版本: Report version	日期 Date	内容 Content
V1.0	2024.10.10	初步调试无源天线设计测试报告
V2.0	2024.10.25	天线无源测试报告



# 测试环境

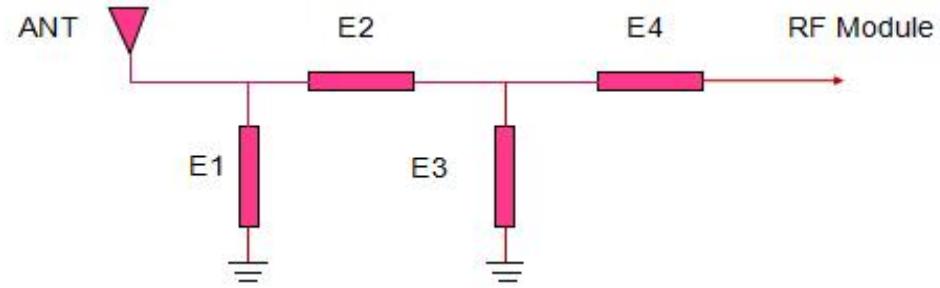


3座远场3D全电波微波暗室实验室系统，1座MVG SG24LT (Satmio) 近场3D微波暗室实验室系统（与国家相关实验室同步）



# 匹配电路

主天线设计: main antenna design		副天线设计: Deputy antenna design		分集天线设计: Diversity antenna design	
元件 Element	值 Value	元件 Element	值 Value	元件 Element	值 Value
E1(0201):	N/A	E1(0201):	N/A	E1(0201):	12nH
E2(0201):	N/A	E2(0201):	4.7pF	E2(0201):	N/A
E3(0201):	N/A	E3(0201):	N/A	E3(0201):	N/A
E4(0201):	N/A	E4(0201):	N/A	E4(0201):	N/A



备注：有源机器调试后再定。

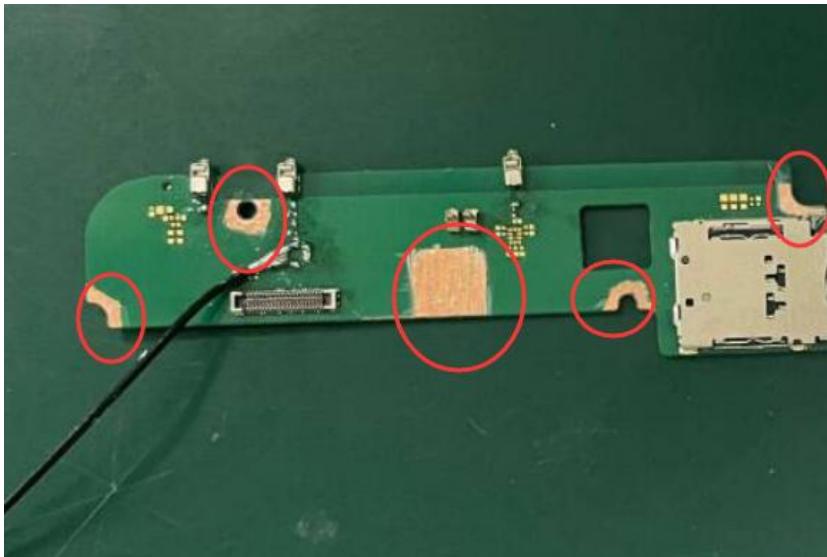


## 主分集天线开关逻辑

RF开关	匹配	控制频段
RF1		<b>GSM:900/1800/1900 WCDMA:B1/2/4/8 LTE:B1/2/3/4/7/8/25/38/39/40/41/66</b>
RF2		<b>LTE:B12/13/28</b>
RF3		<b>GSM:850 WCDMA:B5 LTE : B5/20/26</b>
RF4		<b>LTE : B71</b>

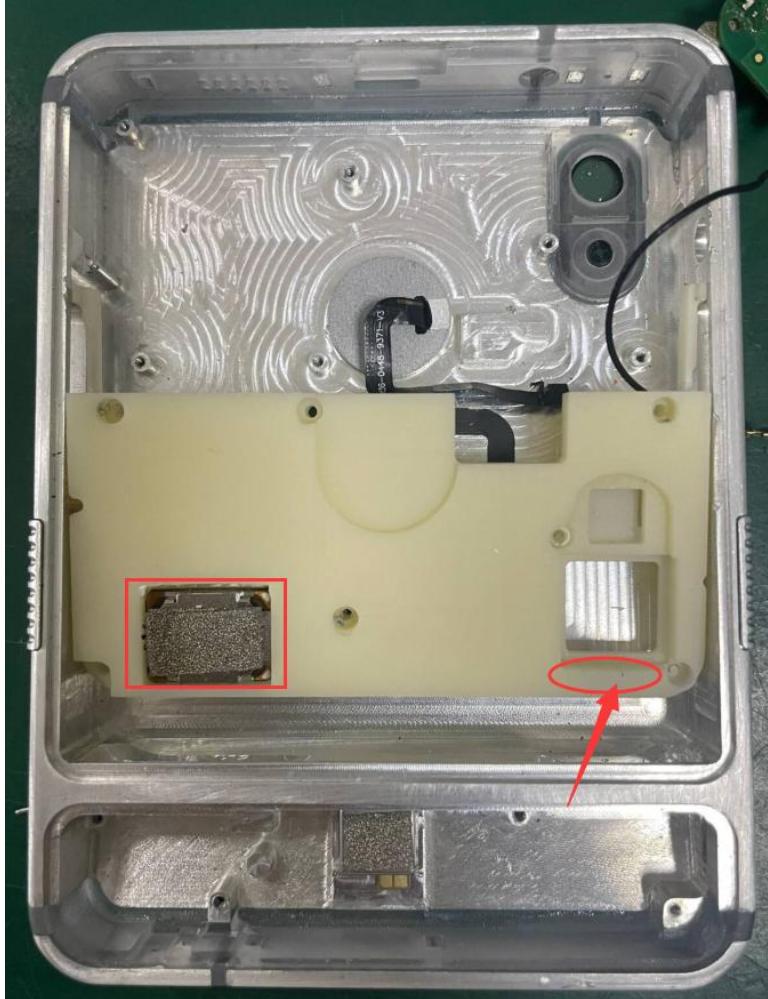
# 环境处理

红色部分区域预留接地，螺丝孔位置预留露铜与金属壳接地.



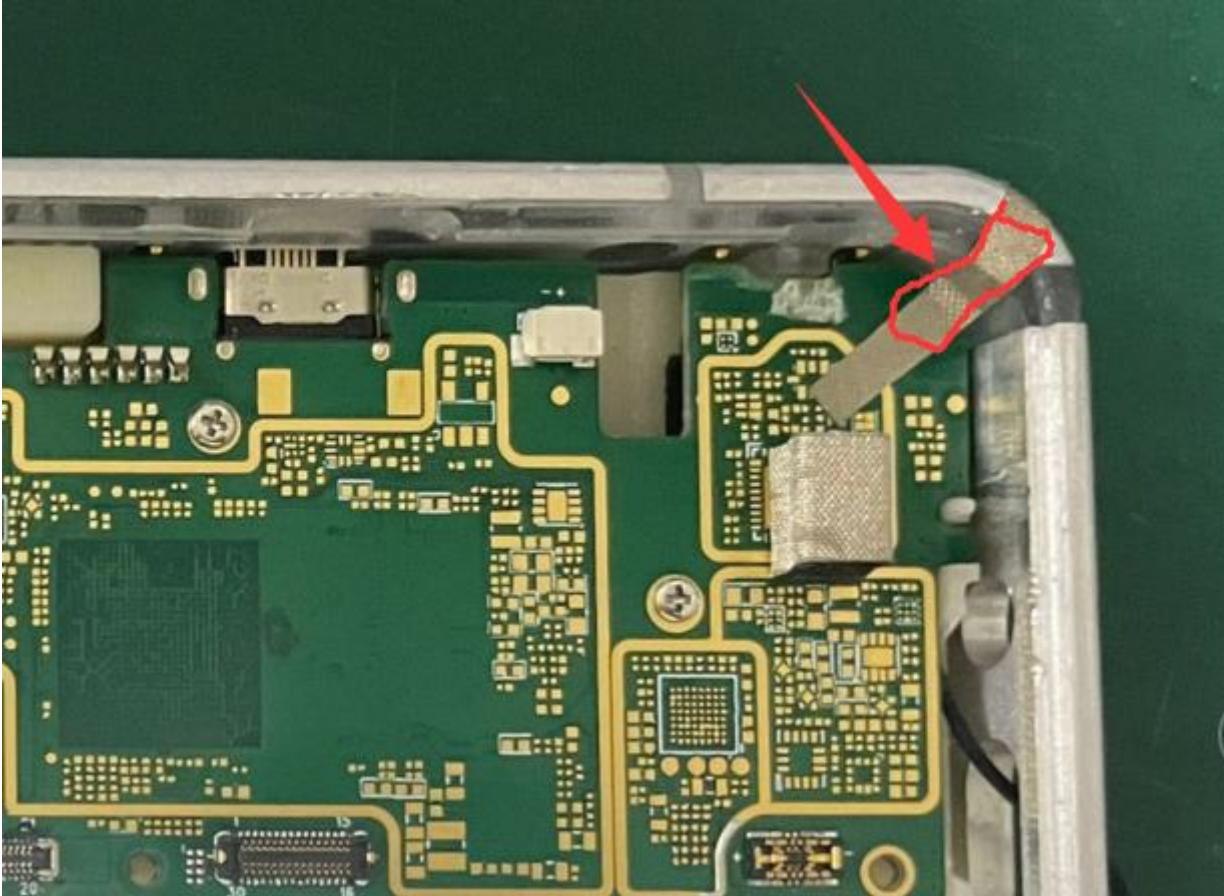
# 环境处理

喇叭预留接地，支架红圈位置预留主板与金属接地。



# 环境处理

三合一边框金属天线长至螺丝孔位置，主板螺丝孔正反面露铜，对地用0欧姆连接。





# 4G主集天线

2.7nH		
Frequency	Efficiency	Efficiency . dB
8000000000	21.57%	-6.66214
8160000000	21.80%	-6.61641
8320000000	26.82%	-5.71505
8480000000	33.16%	-4.79381
8640000000	32.42%	-4.89245
8800000000	33.57%	-4.7408
8960000000	39.06%	-4.08272
9120000000	37.07%	-4.31031
9280000000	35.48%	-4.5004
9440000000	36.83%	-4.33816
9600000000	30.71%	-5.1274

1		
Frequency	Gain . dB	
1700000000	26.24%	
1750000000	23.72%	
1800000000	26.90%	
1850000000	31.43%	
1900000000	32.96%	
1950000000	34.95%	
2000000000	29.32%	
2050000000	27.93%	
2100000000	28.52%	
2150000000	27.98%	
2200000000	27.13%	
2250000000	25.75%	
2300000000	22.60%	
2350000000	23.32%	
2400000000	25.48%	
2450000000	26.74%	
2500000000	29.51%	
2550000000	28.48%	
2600000000	29.68%	
2650000000	33.22%	
2700000000	39.13%	

低频偏B5/8状态

无源效率增益 测量仪器: Agilent Technologies E5071B 300kHz-8.5GHz ENA Series Network Analyzer 暗室系统: MVG SG24LT (Satmio)



# 4G分集天线

0欧			NC			1			1			1		
1	Frequency	Efficiency	Efficiency . dB	1	Frequency	Gain . dB	1	Frequency	Efficiency	Efficiency . dB	1	Frequency	Gain . dB	
700000000	4.96%	-13.0421		700000000	-8.83461		800000000	8.01%	-10.9655		1700000000	13.73%	-8.62304	
713000000	7.95%	-10.9964		713000000	-7.78493		820000000	7.54%	-11.2266		1750000000	14.51%	-8.38338	
726000000	12.96%	-8.87519		726000000	-5.4638		840000000	7.16%	-11.4497		1800000000	14.76%	-8.30846	
739000000	12.15%	-9.1552		739000000	-5.6688		860000000	7.51%	-11.2425		1850000000	15.64%	-8.0571	
752000000	18.43%	-7.34469		752000000	-3.86255		880000000	8.92%	-10.494		1900000000	13.39%	-8.73156	
765000000	23.33%	-6.32134		765000000	-2.51872		900000000	11.38%	-9.43674		1950000000	13.45%	-8.71211	
778000000	21.71%	-6.63306		778000000	-2.67207		920000000	15.87%	-7.99328		2000000000	11.36%	-9.44605	
791000000	25.29%	-5.97112		791000000	-1.79756		940000000	19.06%	-7.1992		2050000000	11.42%	-9.42252	
804000000	18.65%	-7.29226		804000000	-2.79939		960000000	18.23%	-7.39119		2100000000	13.34%	-8.7484	
817000000	14.47%	-8.39639		817000000	-3.00304		980000000	20.52%	-6.87876		2150000000	12.15%	-9.15394	
830000000	12.58%	-9.00363		830000000	-3.69269		1E+09	22.63%	-6.45289		2200000000	13.64%	-8.65282	
843000000	9.27%	-10.3272		843000000	-4.1153						2250000000	19.42%	-7.11743	
856000000	8.76%	-10.5747		856000000	-3.62998						2300000000	21.66%	-6.6433	
869000000	8.28%	-10.8171		869000000	-4.79414						2350000000	23.37%	-6.31273	
882000000	7.90%	-11.0264		882000000	-4.47095						2400000000	24.34%	-6.1365	
895000000	9.19%	-10.3658		895000000	-3.9957						2450000000	21.21%	-6.73433	
908000000	9.94%	-10.0252		908000000	-4.31022						2500000000	19.11%	-7.18772	
921000000	11.16%	-9.52283		921000000	-3.21316						2550000000	18.90%	-7.23449	
934000000	12.87%	-8.90423		934000000	-2.87293						2600000000	17.90%	-7.47242	
947000000	12.18%	-9.14406		947000000	-3.4691						2650000000	12.06%	-9.18699	
960000000	12.27%	-9.11009		960000000	-3.57815						2700000000	8.32%	-10.7981	

无源效率增益 测量仪器: Agilent Technologies E5071B 300kHz-8.5GHz ENA Series Network Analyzer 暗室系统: MVG SG24LT (Satmio)



# GPS/WIFI/BT天线

1			1		
Frequency	Efficiency	Efficiency . dB	Frequency	Gain . dB	
2400000000	16.06%	-7.942526361	2400000000	-0.891943541	
2410000000	16.25%	-7.89240752	2410000000	-0.734775669	
2420000000	16.05%	-7.944161581	2420000000	-0.744798722	
2430000000	16.60%	-7.79907291	2430000000	-0.654177756	
2440000000	17.11%	-7.668732668	2440000000	-0.537794052	
2450000000	17.06%	-7.681050789	2450000000	-0.610625776	
2460000000	17.20%	-7.643708662	2460000000	-0.788397054	
2470000000	17.14%	-7.661102761	2470000000	-0.823355074	
2480000000	16.72%	-7.768078487	2480000000	-0.673536673	
2490000000	15.98%	-7.964681497	2490000000	-0.814651741	
2500000000	15.75%	-8.027634363	2500000000	-0.986298291	

1			1		
Frequency	Efficiency	Efficiency . dB	Frequency	Gain . dB	
1570000000	37.99%	-4.202841675	1570000000	-0.124693795	
1571000000	37.92%	-4.211306427	1571000000	-0.162536558	
1572000000	37.78%	-4.227571787	1572000000	-0.230740801	
1573000000	37.56%	-4.2531693	1573000000	-0.181003057	
1574000000	37.35%	-4.277642354	1574000000	-0.116806311	
1575000000	37.22%	-4.292480147	1575000000	-0.039686637	
1576000000	37.21%	-4.293811853	1576000000	0.018266809	
1577000000	37.29%	-4.283653199	1577000000	0.073173776	
1578000000	37.42%	-4.269418974	1578000000	0.090254071	
1579000000	37.47%	-4.263260613	1579000000	0.093432798	
1580000000	37.32%	-4.280035699	1580000000	0.086705405	

无源效率增益 测量仪器: Agilent Technologies E5071B 300kHz-8.5GHz ENA Series Network Analyzer 暗室系统: MVG SG24LT (Satmio)



# 总结

- 1.以上是初步调试天线无源测试报告。三合一金属天线结构建议作出优化调整。
- 2.主板、小板螺丝孔位置需与金属壳接地，PCB正反面预留露铜接地。
- 3.如有疑问，请电话联系。



## 附加说明

01

报告中天线匹配电路是否改动，天线有关的环境处理是否增加，将直接影响天线性能，请仔细确认查看。

02

贵司如有最新试产或更新产品（如软件，ESD，物料等）请尽快提供我司进行验证，以确认天线性能是否有变化影响。

03

倘若贵司需要送第三方检测机构复测或客户测试，请务必先与我司进行天线相关测试确认，因主板•装配的一致性，以及天线组装的差异等因素，均可能导致天线参数的偏差。

# 谢谢

THANK YOU

如有疑问 请联系我们

日常服务时间：周一至周六 9:00-18:00

总机热线：0755-36615535 销售热线：0755-36615535 传真：0755-82916227

 网址：[www.mayaant.com](http://www.mayaant.com)